

FINAL

# Shoreline Analysis Report for City of Bonney Lake's Shorelines: Lake Tapps and Fennel Creek

June 24, 2010  
TWC Reference # 090808

Prepared for:

**City of Bonney Lake**  
Community Development Dept  
8720 Main Street East  
Bonney Lake, WA 98391

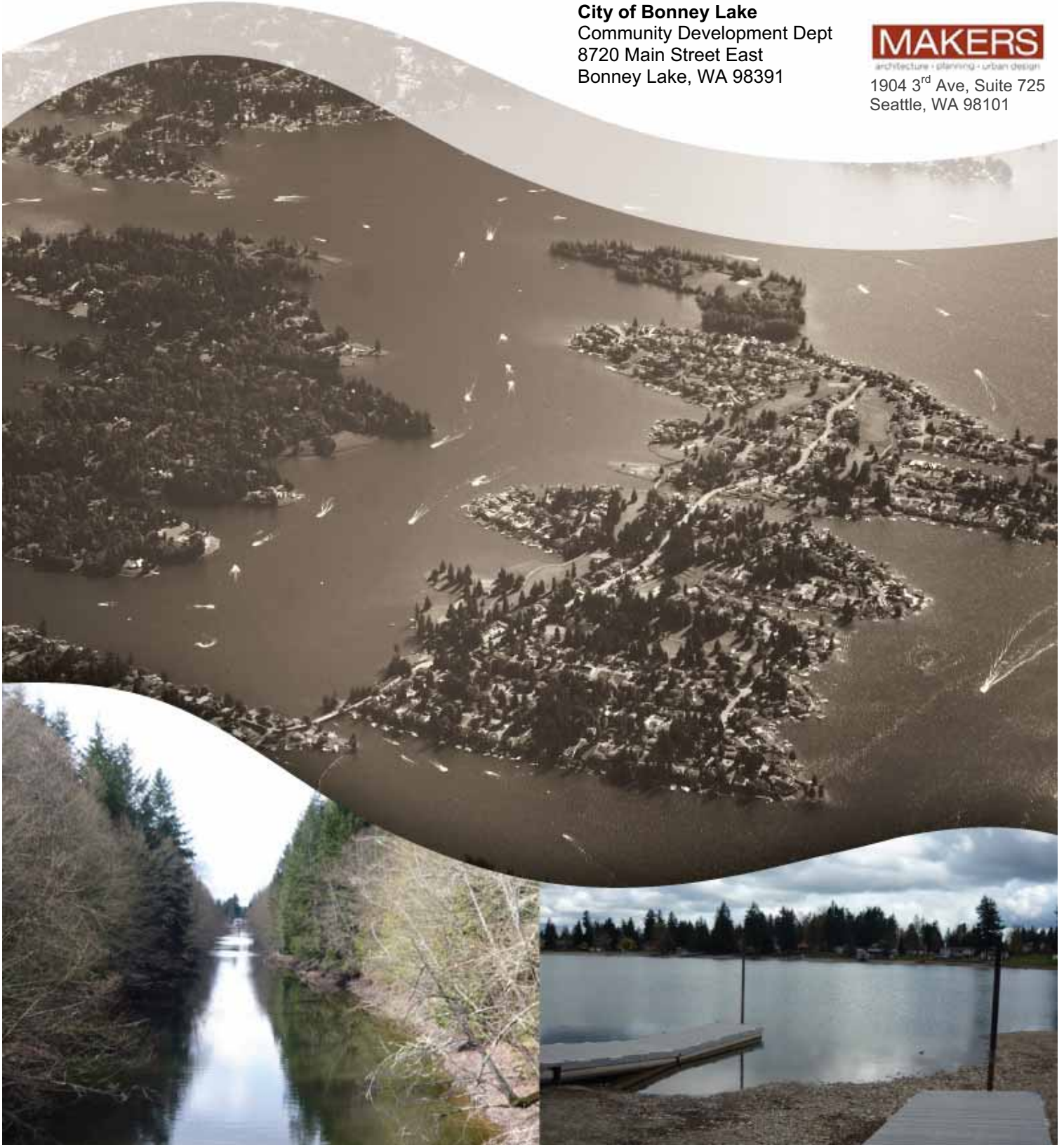
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CITY OF BONNEY LAKE  
GRANT No. G1000016

**SHORELINE ANALYSIS REPORT**

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June 24, 2010

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# TABLE OF CONTENTS

---

|   | Page #    |
|---|-----------|
| <b>1 Introduction.....</b>  | <b>1</b>  |
| 1.1 Background and Purpose.....   | 1         |
| 1.2 Shoreline Jurisdiction.....   | 1         |
| 1.3 Study Area .....  | 2         |
| <b>2 Current Regulatory Framework Summary .....</b>                         | <b>2</b>  |
| 2.1 City of Bonney Lake .....   | 2         |
| 2.2 State and Federal Regulations .....                                     | 4         |
| <b>3 Elements of the Shoreline Inventory &amp; Specific Conditions.....</b> | <b>6</b>  |
| 3.1 Introduction .....  | 6         |
| 3.2 Assessment Unit Conditions .....  | 7         |
| 3.3 Opportunity Areas .....   | 12        |
| 3.3.1 Lake Tapps .....  | 13        |
| 3.3.2 Fennel Creek .....  | 13        |
| 3.4 Data Gaps.....  | 13        |
| <b>4 Analysis of Ecological Functions .....</b>                             | <b>14</b> |
| 4.1 Geographic and Ecosystem Context (WRIA 10).....                         | 14        |
| 4.2 Major Land Use Changes and Current Shoreline Condition .....            | 15        |
| 4.3 Analysis of Ecological Functions .....                                  | 16        |
| 4.3.1 Lake Tapps – Residential.....   | 17        |
| 4.3.2 Lake Tapps – Park Facilities .....                                    | 23        |
| 4.3.3 Lake Tapps - Printz Basin Flume .....                                 | 29        |
| 4.3.4 Fennel Creek .....  | 34        |
| <b>5 Land Use Analysis and Implications .....</b>                           | <b>39</b> |
| 5.1 Introduction .....  | 39        |
| 5.2 Assessment Unit Conditions .....  | 39        |
| <b>6 Public Access Analysis and Implications.....</b>                       | <b>41</b> |

|            |   |           |
|------------|---|-----------|
| <b>6.1</b> | <b>Introduction .....</b>                                       | <b>41</b> |
| <b>6.2</b> | <b>City Parks.....</b>  | <b>41</b> |
|            | <b>6.2.1 Allan Yorke Park .....</b>                             | <b>41</b> |
|            | <b>6.2.2 Church Lake Park .....</b>                             | <b>42</b> |
|            | <b>6.2.3 Inlet Island Park.....</b>                             | <b>42</b> |
| <b>6.3</b> | <b>Trails.....</b>  | <b>42</b> |
|            | <b>6.3.1 Future Fennel Creek Trail .....</b>                    | <b>42</b> |
| <b>6.4</b> | <b>Public Access Implications .....</b>                         | <b>42</b> |
| <b>7</b>   | <b>Shoreline Management Recommendations ....</b>                | <b>43</b> |
|            | <b>7.1 Shoreline Master Program.....</b>                        | <b>43</b> |
|            | <b>7.1.1 Shoreline Environment Designation Provisions .....</b> | <b>43</b> |
|            | <b>7.1.2 General Policies and Regulations .....</b>             | <b>43</b> |
|            | <b>7.1.3 Shoreline Modification Provisions .....</b>            | <b>45</b> |
|            | <b>7.1.4 Shoreline Uses.....</b>                                | <b>45</b> |
|            | <b>7.2 Restoration Plan.....</b>                                | <b>47</b> |
| <b>8</b>   | <b>References .....</b>   | <b>49</b> |
| <b>9</b>   | <b>List of Acronyms and Abbreviations.....</b>                  | <b>51</b> |

Appendix A: List of Data Sources

Appendix B: Information Request Letter and Distribution List

Appendix C: Assessment of Shoreline Jurisdiction

Appendix D: Map Folio (Figures 1-12)

- Figure 1. Existing Shoreline Environment Designations
- Figure 2. Comprehensive Plan Designations
- Figure 3. Zoning Designations
- Figure 4. Surface Water System
- Figure 5. Floodplain Areas
- Figure 6. Wetlands
- Figure 7. Impervious Surfaces
- Figure 8. Potential Landslide and Seismic Hazard Areas
- Figure 9. WDFW Priority Habitats and Species
- Figure 10. Public Access Areas
- Figure 11. Soils
- Figure 12. Sanitary Sewer System

# LIST OF EXHIBITS

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|             |  |    |
|-------------|--|----|
| Exhibit 1.  | City of Bonney Lake shoreline assessment units along Lake Tapps. ....  | 8  |
| Exhibit 2.  | Puyallup-White River, Water Resource Inventory Area (WRIA) #10<br>(Department of Ecology).....   | 15 |
| Exhibit 3.  | Typical view of Lake Tapps shoreline – note high degree of armoring,<br>high pier density (including covered moorage), and sparseness of<br>shoreline vegetation. .... | 18 |
| Exhibit 4.  | View of west facing residential properties on Lake Tapps.....  | 18 |
| Exhibit 5.  | View of east facing residential properties on Lake Tapps. ....   | 19 |
| Exhibit 6.  | View of the shoreline at Allan Yorke Park. ....  | 24 |
| Exhibit 7.  | View of Church Lake Park (private).....  | 24 |
| Exhibit 8.  | View of the unnamed park on Inlet Island (private). ....   | 25 |
| Exhibit 9.  | View of the Printz Basin Flume looking east. Printz Basin is visible in the<br>distance. ....  | 29 |
| Exhibit 10. | View of the Printz Basin Flume as it flows into Lake Tapps. ....   | 30 |
| Exhibit 11. | View of the south side of the Printz Basin Flume, including associated<br>wetland, as it flows into Lake Tapps.....  | 30 |
| Exhibit 12. | View of the City owned property through which Fennel Creek flows (City<br>GIS). ....   | 35 |

# LIST OF TABLES

---

|          |  |    |
|----------|--|----|
| Table 1. | Shoreline Inventory Elements and Information Sources. ....                 | 6  |
| Table 2. | Summary of Inventory by Assessment Unit.....                               | 9  |
| Table 3. | Function Summary of Lake Tapps – Residential.....                          | 20 |
| Table 4. | Function Summary of Lake Tapps – Park Facilities.....                      | 26 |
| Table 5. | Function Summary of Printz Basin Flume. ....                               | 31 |
| Table 6. | Function Summary of Fennel Creek.....                                      | 36 |
| Table 7. | Likely changes in land use and implications for shoreline management. .... | 40 |



# SHORELINE ANALYSIS REPORT

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## CITY OF BONNEY LAKE'S SHORELINES: LAKE TAPPS AND FENNEL CREEK

# 1 INTRODUCTION

---

## 1.1 Background and Purpose

The City of Bonney Lake (City) obtained a grant from the Washington Department of Ecology (Ecology) in 2009 to complete a comprehensive Shoreline Master Program (SMP) update. One of the first steps of the update process is to inventory and characterize the City's shorelines as defined by the state's Shoreline Management Act (SMA) (RCW 90.58). This inventory was conducted in accordance with the Shoreline Master Program Guidelines (Guidelines, Chapter 173-26 WAC) and project Scope of Work promulgated by Ecology, and includes all areas within current City limits. Under these Guidelines, the City must identify and assemble the most current, accurate and complete scientific and technical information available that is applicable. This shoreline inventory and analysis will describe existing conditions and characterize ecological functions in the shoreline jurisdiction. This will serve as the baseline against which the impacts of future development actions in the shoreline will be measured. The Guidelines require that the City demonstrate that its updated SMP yields "no net loss" in shoreline ecological functions relative to the baseline due to its implementation.

A list of potential information sources was compiled (Appendix A) and an information request letter was distributed to potential interested parties and agencies that may have relevant information (Appendix B). Collected information was supplemented with other resources such as City documents, scientific literature, personal communications, aerial photographs, internet data, and a brief physical inventory of the City's shorelines.

## 1.2 Shoreline Jurisdiction

As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated "shorelands." At a minimum, the waterbodies designated as shorelines of the state are streams whose mean annual flow is 20 cubic feet per second (cfs) or greater, lakes whose area is greater than 20 acres, and all marine waters. Shorelands are defined as:

"those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters

which are subject to the provisions of this chapter...Any county or city may determine that portion of a one-hundred-year-floodplain to be included in its master program as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom... Any city or county may also include in its master program land necessary for buffers for critical areas (RCW 90.58.030)”

The northern portion of the City of Bonney Lake is located along the shoreline of Lake Tapps. Lake Tapps is approximately 4.5 square miles in size, and is therefore included in a classification of unique shorelines known as Shorelines of Statewide Significance. Fennel Creek exceeds the 20 cfs cutoff point after it leaves the main southern boundary of the City. However, the stream then briefly flows through a City owned parcel located on Rhodes Lake Road East (just downstream of Victor Falls). The entire jurisdiction assessment and determination process can be reviewed in greater detail in Appendix C of this report.

### **1.3 Study Area**

The City of Bonney Lake is located in Pierce County, WA. The City encompasses approximately 5.5 square miles and is bordered nearly on all sides by unincorporated Pierce County jurisdiction, with a small shared border with Sumner along the northwest portion of the City. The City of Auburn is located generally north of Bonney Lake at the north end of Lake Tapps. Puyallup is located to the west, Buckley to the east, and Orting to the south. Only a portion of Lake Tapps is located in the City’s shoreline jurisdiction, while the remainder is located in unincorporated Pierce County. The upper portion of Fennel Creek passes through a substantial portion of the City, but as mentioned above, Fennel Creek does not meet the 20 cfs flow threshold (i.e. shoreline designation criteria) until further downstream, south of the main southern boundary of the City. Only briefly does the stream pass through the City owned parcel located on the south side of Rhodes Lake Road East. The study area for this report includes all land currently within the City’s proposed shoreline jurisdiction (Appendix C). The total area subject to the City’s updated SMP, not including aquatic area, is approximately 245 acres (0.38 square mile), and encompasses approximately 10.4 miles (54,761 feet) of shoreline.

## **2 CURRENT REGULATORY FRAMEWORK SUMMARY**

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### **2.1 City of Bonney Lake**

The Shoreline Management Act of 1971 brought about many changes for local jurisdictions, including the City of Bonney Lake. The legislative findings and policy intent of the SMA states:

“There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort, jointly performed by federal, state, and local governments, to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines (RCW 90.58.020).”

While protecting shoreline resources by regulating development, the SMA is also intended to provide balance by encouraging water-dependent or water-oriented uses while also conserving or enhancing shoreline ecological functions and values. The SMP will be based on state guidelines, but tailored to the specific conditions and needs of individual communities. Considering that Lake Tapps is a Shoreline of Statewide Significance, the SMP will need to address specific management policies as listed in WAC 173-26-251 which gives preference to uses in the following order of preference which:

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline;
- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary."

The City's first Shoreline Master Program was adopted in 1975. The City has not subsequently updated the document other than minor revisions to the administrative provisions found separately in Chapter 16.08 (Shoreline Management) of the Municipal Code. Regulations applicable to critical areas which are located within shoreline jurisdiction underwent a comprehensive update in 2004, consistent with Growth Management Act requirements for use of "best available science." In those regulations, the City specified a stream buffer of 200 feet for Fennel Creek.

Most of the uses, developments, and activities regulated under the Critical Areas Regulations are also subject to the City's Comprehensive Plan, the Bonney Lake Municipal Code, the International Building Code, and various other provisions of City, State and federal laws. Any applicant must comply with all applicable laws prior to commencing any use, development, or activity. Bonney Lake will ensure consistency between the SMP and other City codes, plans and programs by reviewing each for consistency during periodic updates of the City's Comprehensive Plan as required by State statute.

## 2.2 State and Federal Regulations

State and federal regulations most pertinent to development in the City's shorelines include the federal Endangered Species Act, the federal Clean Water Act, the State Shoreline Management Act, and the State Hydraulic Code. Other relevant federal laws include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, Coastal Zone Management Act, and the Migratory Bird Treaty Act. State laws which address shoreline issues include the Growth Management Act, State Environmental Policy Act, State Clean Water Act (RCW 90.48), tribal agreements and case law, Watershed Planning Act, Water Resources Act, Salmon Recovery Act, and the Water Quality Protection Act. A variety of agencies (e.g., U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, FEMA, Washington Department of Ecology, Washington Department of Fish and Wildlife) are involved in implementing these regulations, but review by these agencies of shoreline development in most cases would be triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing. Depending on the nature of the proposed development, State and Federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. With the comprehensive SMP update, the City will strive to ensure that Bonney Lake's SMP regulations are consistent with other State and Federal requirements and explore ways to streamline the shoreline permitting process. A summary of some of the key regulations and agency responsibilities follows.

**Section 404:** Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate "discharge of dredged or fill material into waters of the United States, including wetlands" ([http://www.epa.gov/owow/wetlands/pdf/reg\\_authority\\_pr.pdf](http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf)). The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. As applicable to the City of Bonney Lake's shoreline jurisdiction, however, it generally means that the Corps must review and approve most activities in streams, wetlands, and lakes. These activities may include lake or wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. Similar to SEPA requirements, the Corps is interested in avoidance, minimization, restoration, and compensation of impacts.

**Federal Endangered Species Act (ESA):** Section 9 of the ESA prohibits "take" of listed species. Take has been defined in Section 3 as: "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The take prohibitions of the ESA apply to everyone, so any action of the City that results in a take of listed fish or wildlife would be a violation of the ESA and exposes the City to risk of lawsuit. Per Section 7 of the ESA, activities with potential to affect federally listed or proposed species and that either require federal approval, receive federal funding, or occur on federal land must be reviewed by the National Marine Fisheries Service

(NOAA Fisheries) and/or U.S. Fish and Wildlife Service (USFWS) via a process called “consultation.” Federally listed species are known to use Fennel Creek below Victor Falls, thereby placing them within shoreline jurisdiction. These species include Puget Sound Chinook (federally threatened), Puget Sound coho (federal species of concern), and possibly migratory bull trout (federally threatened).

**Section 401 Water Quality Certification:** Section 401 of the federal Clean Water Act allows states to review, condition, and approve or deny certain federal permitted actions that result in discharges to state waters, including wetlands. In Washington, the Department of Ecology is the state agency responsible for conducting that review, with their primary review criteria of ensuring that state water quality standards are met. Actions within streams, lakes or wetlands within the shoreline zone that require a Section 404 permit (see above), will also need to be reviewed by Ecology.

**Hydraulic Code:** Chapter 77.55 RCW (the Hydraulic Code) gives the Washington Department of Fish and Wildlife (WDFW) the authority to review, condition, and approve or deny “any construction activity that will use, divert, obstruct, or change the bed or flow of state waters.” As applicable to the City of Bonney Lake’s shoreline jurisdiction, however, it generally means that WDFW must review and approve most activities in any of the shoreline waterbodies. These activities may include pier and bulkhead repair or construction, stream alteration, and culvert installation or replacement, among others. WDFW can condition projects to avoid, minimize, restore, and compensate adverse impacts.

**Instream Resources Protection Program-Puyallup River Basin, Water Resource Inventory Areas (WRIA) 10:** WAC 173-510 applies minimum instream flow requirements to streams within the Puyallup River Basin (WRIA 10). This includes the White River, from which Lake Tapps receives diverted water. During periods of low stream flow in the White River, diversion to Lake Tapps may be decreased or stopped altogether. The purpose of this rule is to “retain perennial rivers, streams, and lakes in the Puyallup River basin with instream flows and levels necessary to provide protection for wildlife, fish, scenic-aesthetic, environmental values, recreation, navigation, and to preserve high water quality standards” (Ecology 1998).

# 3 ELEMENTS OF THE SHORELINE INVENTORY & SPECIFIC CONDITIONS

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## 3.1 Introduction

Development of a shoreline inventory is intended to record the existing or baseline conditions upon which the development of shoreline master program provisions will be examined to ensure the adopted regulations provide no net loss of shoreline ecological functions. At a minimum, local jurisdictions shall gather the inventory elements listed in the Guidelines, to the extent information is relevant and readily available. Table 1 lists those relevant inventory elements in which data is available for the City’s shorelines. Areas of data gaps are listed in section 3.4. The table also describes the information collected for each of the required inventory elements. A list of inventory elements and the various data sources that were utilized for each element are provided in Appendix A. Figures depicting the various inventory pieces listed in Table 1 are provided in Appendix D (Figures 1-12).

Table 1. Shoreline Inventory Elements and Information Sources.

| <b>Inventory Element</b>                    | <b>Information Gathered</b>                                    | <b>Data Sources</b>                | <b>Appendix D Map</b> |
|---|--|------------------------------------|-----------------------|
| Existing Shoreline Environment Designations | Existing Shorelines  | City GIS                           | Figure 1              |
| Proposed Shoreline Jurisdiction             | Shorelines, Wetlands, Floodways and Floodplains, City Boundary | City and County GIS, FEMA, Ecology | Figures 2-12          |
| Land Use Patterns                           | Zoning and Comprehensive Plan Designations                     | City                               | Figures 2 and 3       |
| Utilities                                   | Surface/stormwater facilities, including streams               | City and County                    | Figure 4              |
|   | Sanitary sewer   | City and County                    | Figure 12             |
| Impervious Surfaces                         | Roads, parking lots, & buildings                               | USGS                               | Figure 7              |

| Inventory Element                     | Information Gathered   | Data Sources                  | Appendix D Map   |
|---------------------------------------|--|-------------------------------|------------------|
| Shoreline Modifications               | Piers/docks and other overwater structures (derived from aerial photo)     | City                          | N/A <sup>1</sup> |
|                                       | Armoring (derived from aerial photo)                                       | City                          | N/A <sup>1</sup> |
| Public Access Areas                   | Waterfront parks and open spaces   | City                          | Figure 10        |
| Soils                                 | Soil types   | USDA NRCS (SSURGO)            | Figure 11        |
| Floodplains & Channel Migration Zones | Floodway, Floodplains; CMZ not applicable in City of Bonney Lake shoreline | County, FEMA                  | Figure 5         |
| Transportation                        | Highways, arterials, local streets   | City and County               | various          |
| Critical Areas                        | Streams  | City, County, USDA NRCS, WDFW | Figure 4         |
|                                       | Wetlands, & habitat conservation areas                                     | City, County, WDFW            | Figures 6 and 9  |
|                                       | geologically hazardous areas   | City and County               | Figure 8         |
| Areas of Special Interest             | Priority Habitats and Species  | WDFW                          | Figure 9         |
| Water quality impairment              | 303(d)/305(b) waters and regulated sites                                   | Ecology                       | N/A <sup>2</sup> |
| Historical and Archeological Sites    | Review of WISSARD  | DAHP                          | N/A <sup>3</sup> |

<sup>1</sup> Inventory of shoreline modifications was performed via aerial photo interpretation. This was for quantification purposes only and did not include GIS data creation

<sup>2</sup> List of impaired waterbodies and corresponding impairment derived from Ecology website

<sup>3</sup> Review of historical and archeological sites based on Washington Department of Archaeology & Historic Preservation. <https://fortress.wa.gov/dahp/wisaard/>

### 3.2 Assessment Unit Conditions

In order to break down the shoreline into manageable units and to help evaluate differences between discrete shoreline areas, the shorelines have been divided into assessment units based on waterbody, land use and ecological condition as follows and as illustrated on Figures 2-12 in Appendix D. The Lake Tapps assessment units are shown in Exhibit 1 below.

- Lake Tapps – Residential
- Lake Tapps – Park Facilities
- Lake Tapps – Printz Basin Flume
- Fennel Creek



Exhibit 1. City of Bonney Lake shoreline assessment units along Lake Tapps.

Table 2 expands upon the relevant above required inventory elements, providing specific detail and relevant data for each of the assessment units.

Table 2. Summary of Inventory by Assessment Unit.

| Inventory Element                 | Shoreline Assessment Unit  |   |   |  |
|-----------------------------------|--|---|---|--|
|                                   | Residential  | Lake Tapps  |   | Fennel Creek   |
|                                   |  | Park Facilities   | Printz Basin  |  |
| <b>Assessment Unit Dimensions</b> | <ul style="list-style-type: none"> <li>• 48,382.3 linear feet of shoreline frontage</li> <li>• 201.1 acres</li> </ul>  | <ul style="list-style-type: none"> <li>• 1727.4 linear feet of shoreline frontage</li> <li>• 9.7 acres</li> </ul> | <ul style="list-style-type: none"> <li>• 3,362.4 linear feet of shoreline frontage</li> <li>• 27.7 acres</li> </ul> | <ul style="list-style-type: none"> <li>• 1,289.2 linear feet of shoreline frontage</li> <li>• 6.8 acres</li> </ul> |
| <b>Zoning</b>                     | <ul style="list-style-type: none"> <li>• Residential (R-1) - 89%</li> <li>• Medium-Density Residential (R-2) - 9%</li> <li>• High-Density Residential (R-3) - 1%</li> <li>• Public Facilities (PF) – 1%</li> <li>• Single-Family Residential - 87%</li> <li>• Medium-Density Residential - 11%</li> <li>• High-Density Residential - 1%</li> <li>• Conservation/Open Space – 1%</li> </ul> | <ul style="list-style-type: none"> <li>• Public Facilities – 74%</li> <li>• Residential – 26%</li> </ul>          | <ul style="list-style-type: none"> <li>• Residential (R-1) - 100%</li> </ul>  | <ul style="list-style-type: none"> <li>• Public Facilities - 100%</li> </ul>                                       |
| <b>Comprehensive Plan</b>         | <ul style="list-style-type: none"> <li>• Conservation/Open Space – 71%</li> <li>• Single Family Residential – 29%</li> </ul>   | <ul style="list-style-type: none"> <li>• Single-Family Residential - 100%</li> </ul>                              | <ul style="list-style-type: none"> <li>• Public Facilities - 100%</li> </ul>  |  |
| <b>Waterfront Parcels</b>         | 465  | 9   | 1   | 1  |
| <b>Vacant Land</b>                | <ul style="list-style-type: none"> <li>• 10.3 acres (25 parcels)</li> <li>• 2.3 acres (3 parcels) can be sub-divided</li> </ul>  | N/A   | N/A   | N/A  |
| <b>Sub-dividable Land</b>         | <ul style="list-style-type: none"> <li>• 9.4 acres (17 parcels)</li> <li>• 7.1 acres (14 parcels) are developed and 2.3 acres (3 parcels) are vacant</li> </ul>  | N/A   | N/A   | N/A  |
| <b>Impervious Surface</b>         | 33%  | 29%   | 2%  | 1%   |

| Inventory Element                     | Shoreline Assessment Unit  |   |  |   |
|---------------------------------------|--|---|--|---|
|                                       | Lake Tapps   |   | Printz Basin   | Fennel Creek  |
|                                       | Residential  | Park Facilities   |  |   |
| <b>Overwater Cover<sup>1</sup></b>    | <ul style="list-style-type: none"> <li>• 516 piers, docks, or other structures</li> <li>• 5 lots w/o structures (1%)</li> <li>• ~83 boat canopies (18% of waterfront lots)</li> </ul>                        | <p>8 piers, docks, or other structures – includes swim enclosures</p>   | No piers, docks, or other structures   | NA  |
| <b>Shoreline Armoring<sup>2</sup></b> | <ul style="list-style-type: none"> <li>• Not Armored: ~4,750 ft (10%)</li> <li>• Bulkhead: 90%</li> <li>• Boat Ramps: ~49 ramps (11% of waterfront lots)</li> </ul>  | <ul style="list-style-type: none"> <li>• Not Armored: ~1020 ft (59%)</li> <li>• Bulkhead: ~700 ft (41%)</li> <li>• Boat Ramps: 3</li> </ul>   | <ul style="list-style-type: none"> <li>• Not Armored - 100%</li> </ul>   | NA  |
| <b>Stormwater Outfalls</b>            | 15   | 1   | 0  | 0   |
| <b>Public Access</b>                  | No formal physical public access, visual access from private properties and roadways   | <ul style="list-style-type: none"> <li>• Allan Yorke Park (public)</li> <li>• Church Lake Park (private)</li> <li>• Unnamed Inlet Island park (private)</li> </ul>                      | There are no public access opportunities.  | There are no public access opportunities.   |
| <b>Critical Areas</b>                 | <ul style="list-style-type: none"> <li>• Wetlands – as percent of area (13%)</li> <li>• Floodplain – 10%</li> <li>• Geologically Hazardous Areas - 29%</li> <li>• Habitat Conservation Areas – 0%</li> </ul> | <ul style="list-style-type: none"> <li>• Wetlands – 18%</li> <li>• Floodplain – 16%</li> <li>• Geologically Hazardous Areas - 0%</li> <li>• Habitat Conservation Areas – 54%</li> </ul> | <ul style="list-style-type: none"> <li>• Wetlands – 25%</li> <li>• Floodplain – 8%</li> <li>• Geologically Hazardous Areas - 13%</li> <li>• Habitat Conservation Areas – 0%</li> </ul> | <ul style="list-style-type: none"> <li>• Wetlands – 49%</li> <li>• Floodplain – 35%</li> <li>• Geologically Hazardous Areas - 85%</li> <li>• Habitat Conservation Areas – 0%</li> </ul> |
| <b>Listed Species</b>                 | <ul style="list-style-type: none"> <li>• None listed</li> </ul>  | <ul style="list-style-type: none"> <li>• None listed</li> </ul>   | <ul style="list-style-type: none"> <li>• None listed</li> </ul>  | <ul style="list-style-type: none"> <li>• Chinook salmon</li> <li>• Steelhead</li> </ul>   |
| <b>Priority Habitat and Species</b>   | <ul style="list-style-type: none"> <li>• Waterfowl Concentrations</li> <li>• Priority wetlands</li> <li>• Bald Eagle</li> </ul>  | <ul style="list-style-type: none"> <li>• Waterfowl Concentrations</li> <li>• Priority wetlands</li> <li>• Bald Eagle</li> </ul>   | <ul style="list-style-type: none"> <li>• Waterfowl Concentrations</li> <li>• Priority wetlands</li> <li>• Bald Eagle</li> </ul>  | <ul style="list-style-type: none"> <li>• Priority wetlands</li> </ul>   |

| Inventory Element                         | Shoreline Assessment Unit  |  |                         |              |
|---|--|--|-------------------------|--------------|
|   | Lake Tapps   |  | Printz Basin            | Fennel Creek |
|   | Residential  | Park Facilities  |                         |              |
| <b>Impaired Waters (303d/305b)</b>        | <ul style="list-style-type: none"> <li>Invasive exotic species (Category 4C)</li> <li>Total Phosphorus (Category 1)</li> </ul> | <ul style="list-style-type: none"> <li>Invasive exotic species (Category 4C)</li> <li>Total Phosphorus (Category 1)</li> </ul> | Invasive exotic species | N/A          |
| <b>Historical and Archeological Sites</b> | Recorded artifacts <sup>3</sup>  | Recorded artifacts <sup>3</sup>  | None listed             | None listed  |

<sup>1</sup> Assessment of overwater cover conducting using 2008 aerial photo. Digitized cover was not available in GIS.

<sup>2</sup> Assessment of shoreline armoring conducting using 2008 aerial photo. This assessment tallied the number of unarmored waterfront lots. Based on the total shoreline length and the number of waterfront parcels, an average length of 100 feet of water edge was estimated per lot.

<sup>3</sup> Recorded artifacts along the Lake Tapps shoreline include lithic scatters and charcoal deposits. Documentation of harvest of anadromous fish and hunting of upland mammals also occurred on nearby streams and rivers (ESA 2007).

### 3.3 Opportunity Areas

Ecology's *Shoreline Master Program Guidelines* (173-26 WAC) includes the following definition:

*"Restore," "Restoration" or "ecological restoration" means the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including but not limited to re-vegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions.*

Consistent with Ecology's definition, use of the word "restore," or any variations, in this document is not intended to encompass actions that re-establish historic conditions. Instead, it encompasses a suite of strategies that can be approximately delineated into four categories: creation (of a new resource), restoration (of a converted or substantially degraded resource), enhancement (of an existing degraded resource), and protection (of an existing high-quality resource).

There is a critical distinction between restoration and mitigation. Mitigation will require applicants whose shoreline proposals will have adverse impacts to complete actions to mitigate those impacts or provide compensation in other ways for losses of ecological function. The City can encourage applicants to implement restoration actions that will improve ecological functions relative to the applicant's pre-project condition. As stated in WAC 173-26-201(2)(c):

*It is intended that local government, through the master program, along with other regulatory and nonregulatory programs, contribute to restoration by planning for and fostering restoration and that such restoration occur through a combination of public and private programs and actions. Local government should identify restoration opportunities through the shoreline inventory process and authorize, coordinate and facilitate appropriate publicly and privately initiated restoration projects within their master programs. The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county."*

The Opportunity Areas discussions below present options for "restoration" that would improve ecological functions. For example, enhancement of riparian vegetation, reductions or modifications to shoreline hardening, minimization of in- and over-water structures, and improvements to fish habitat would each increase one or more ecological parameters of the City's shoreline. The City or City residents could implement these options voluntarily or, depending on specific project details, they could be required measures to mitigate adverse impacts of new shoreline projects.

### 3.3.1 Lake Tapps

Although Lake Tapps is geographically located in WRIA 10, it is disconnected from major waterways and salmon-bearing streams via the diversion flume in the City of Buckley (inlet) and the former Puget Sound Energy powerhouse channel (outlet). Otherwise, the lake is generally connected through localized effects of urbanization on watershed-level processes (e.g., generation and discharges of stormwater runoff, reduced groundwater recharge, deforestation, etc). As such, restoration opportunities on Lake Tapps are less about salmon conservation (as is common around the region) and more about water quality and habitat improvements for other terrestrial and aquatic wildlife.

Opportunities include:

- Collaborate on the removal of Eurasian milfoil and other invasive aquatic plants
- Remove non-native invasive terrestrial vegetation
- Enhance shoreline vegetation by planting native tree and shrub communities
- Encourage the joint-use of overwater structures
- Many residential (and some park) shoreline properties on Lake Tapps have the potential for improvement of ecological functions through: 1) reduction or modification of shoreline armoring, 2) reduction of overwater cover and in-water structures (grated pier decking, pier size reduction, pile size and quantity reduction, moorage cover removal), 3) improvements to nearshore native vegetative cover, and/or 4) reductions in impervious surface coverage

### 3.3.2 Fennel Creek

The Fennel Creek shoreline area will benefit most from continued preservation and protection.

## 3.4 Data Gaps

GIS information was not located or incomplete for the following parameters:

- Vegetative cover
- Shoreline modifications (digitized piers/docks and bulkheads)
- Toxic or hazardous material sites

Although information about each of the above items might help develop a fuller picture of shoreline conditions and processes, it is not expected that the absence of these items would have significant impacts on the selection of environment designations or the development of the SMP. Qualitative assessments of each component can be derived from aerial photo interpretation.

## 4 ANALYSIS OF ECOLOGICAL FUNCTIONS

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### 4.1 Geographic and Ecosystem Context (WRIA 10)

The City of Bonney Lake is located in Pierce County in the Puget Sound Region, and contains freshwater shorelines associated with Washington State's Water Resource Inventory Area (WRIA) 10 – Puyallup-White River (Exhibit 2). The City's shorelines are more specifically located in the Lake Tapps Sub-basin (of the White River watershed) and the Fennel Creek Sub-basin (of the Puyallup River watershed). Characteristics for the White River Basin are described in the White River Basin Plan Characterization Report (Pierce County 2007). Additional characteristics for Lake Tapps as a whole are presented in the Draft Pierce County Inventory and Characterization Report (ESA 2007).

Lake Tapps, which was originally four small lakes, is now the largest lake/reservoir in Pierce County, totaling approximately 4.5 square miles in surface area (2,296 acres) and includes approximately 45 miles of shoreline. The City includes 9.5 miles of Lake Tapps shoreline frontage, resulting in 211 acres of shoreline jurisdiction area associated with the lake (includes the associated wetland complexes). An additional 27.7 acres of shoreline jurisdiction, including associated wetlands, is located along the Printz Basin.

Lake Tapps was formed in the early 1900's as a water reservoir for hydroelectric power generation by building nearly 2.5 miles of dikes and embankments around four small lakes. Water is diverted from the White River at a facility in the City of Buckley and then transported through a combination of flumes and open channels to Lake Tapps. Discharge from Lake Tapps enters back into the White River near the City of Sumner. Puget Sound Energy has recently ceased hydroelectric production in Lake Tapps and has sold the lake and the associated water right to the Cascade Water Alliance. Future lake operation (elevation and corresponding hydrograph) will be determined by Cascade Water Alliance (CWA) but coordinated through the Lake Tapps Community Council. Much like operations conducted during Puget Sound Energy's ownership, CWA plans to maintain higher water levels in the spring, summer and fall for recreational purposes. In late fall through winter, the lake levels are lowered to allow homeowners to repair and maintain docks and bulkheads and also to provide for dike maintenance/repair and control of milfoil.

In 2005, CWA and Pierce County entered into a Memorandum of Understanding (MOU) on management of Lake Tapps which outlines a coordinated effort for the long-term operation and management of Lake Tapps for public water supply and recreational purposes. CWA also works with the neighboring cities of Auburn, Buckley and Sumner to help assure all four cities of a consistent water supply for the next 50 years. The Washington State Department of Ecology is reviewing current information regarding the use of Lake Tapps as a municipal water supply.

Testing of Lake Tapps water quality by the Department of Ecology has found that the lake can be classified as oligotrophic (i.e. nutrient limited) but has recorded elevated levels of chlorophyll concentrations and hypolimnetic oxygen depletion which would indicate that the lake is more mesotrophic. (i.e. moderately productive) (Ecology 2006).

Within the southern portion of the City, shoreline jurisdiction includes a small segment of Fennel Creek, totaling ¼-mile, as it meanders through City owned property. The shoreline area for the stream is 6.8 acres. Fennel Creek is a tributary to the Puyallup River, and drains a total of approximately 11 square miles. Fennel Creek originates near the north side of SR-410 east of its intersection with 233rd Street East. The stream drains an area of various land uses including, agricultural, rural, and residential. Fennel Creek flows through several steep canyons before emptying into the Puyallup River.

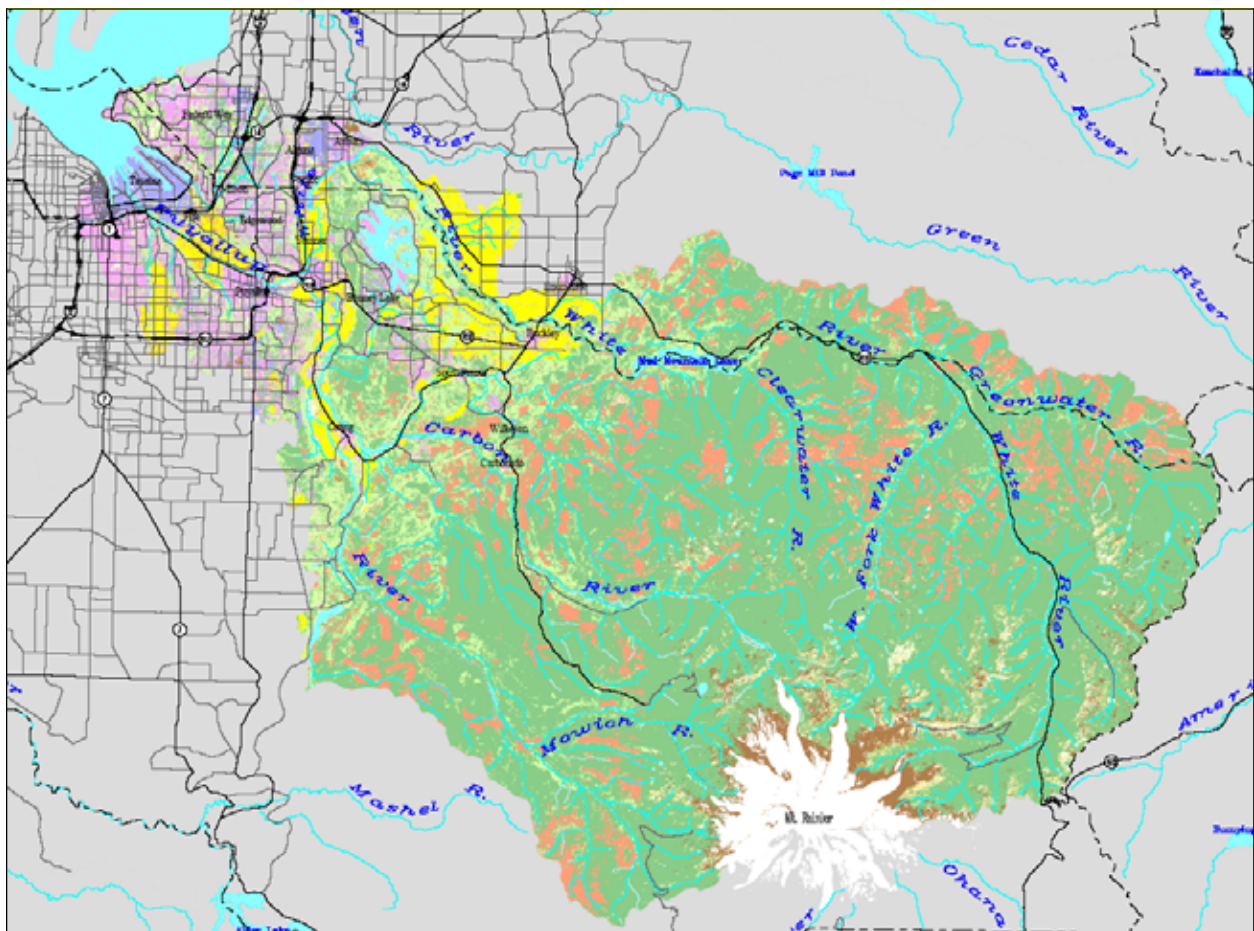


Exhibit 2. Puyallup-White River, Water Resource Inventory Area (WRIA) #10 (Department of Ecology).

## 4.2 Major Land Use Changes and Current Shoreline Condition

Bonney Lake incorporated as a City in 1949 with a population of 327. Soon, its popularity and natural beauty, combined with changing commuter habits, attracted

more and more residents, changing its character from that of a small town to that of a suburban community. By 2008 the City had grown to a population of approximately 16,800.

Single-family residences are the predominant land use within shoreline jurisdiction, as well as in the City as a whole. The housing stock is relatively new, with significant portions of the housing having been built in each of the subsequent decades since incorporation in 1949. Neighborhoods have developed at comparatively low densities, with typical lot sizes in excess of 10,000 square feet.

There is only one area in which single-family residences do not predominate. The corridor along SR-410 includes commercial and manufacturing areas as well as the City’s downtown core. The downtown area includes retail, offices, civic, parks and multi-family uses. However, no portion of this area is located within shoreline jurisdiction.

Around the City’s Lake Tapps shoreline, there are only 3 parks (1 public and two private) and one potential multi-family residential development located just north of Allan Yorke Park (Comprehensive Plan Designation of High Density Residential). While CWA operations of Lake Tapps as a water supply reservoir rather than former hydroelectric power generation may have some effect on the annual hydrograph, water levels are not expected to affect future land use changes. Regulations under the City’s SMP are also not likely to impact or regulate water withdrawal strategies by CWA. Future land use is discussed in greater detail in Section 5 of this report.

### 4.3 Analysis of Ecological Functions

Ecological processes and functions of the City of Bonney Lake’s shoreline areas are summarized in Tables 3 through 6. These tables are organized around the Department of Ecology’s list of processes and functions for freshwater lakes and streams. The list includes the evaluation of three major processes: 1) hydrologic; 2) vegetation; and 3) habitat. These are further broken down into the following functions which are in turn used to evaluate assessment unit performance:

| Lake Functions   | Stream Functions   |
|--|--|
| <p><b>1. Hydrologic Functions</b></p> <ul style="list-style-type: none"> <li>• Storing water and sediment</li> <li>• Attenuating wave energy</li> <li>• Removing excess nutrients and toxic compounds</li> <li>• Recruitment of large woody debris (LWD) and other organic material</li> </ul> | <p><b>1. Hydrologic Functions</b></p> <ul style="list-style-type: none"> <li>• Storing water and sediment</li> <li>• Transport of water and sediment</li> <li>• Attenuating flow energy</li> <li>• Developing pools, riffles, and gravel bars</li> <li>• Removing excess nutrients and toxic compounds</li> <li>• Recruitment of LWD and other organic material</li> </ul> |
| <p><b>2. Vegetative Functions</b></p> <ul style="list-style-type: none"> <li>• Temperature regulation</li> </ul>   | <p><b>2. Vegetative Functions</b></p> <ul style="list-style-type: none"> <li>• Temperature regulation</li> </ul>   |

| Lake Functions  | Stream Functions   |
|---|--|
| <ul style="list-style-type: none"> <li>• Water quality improvement</li> <li>• Attenuating wave energy</li> <li>• Sediment removal and bank stabilization</li> <li>• LWD and organic matter recruitment</li> </ul> | <ul style="list-style-type: none"> <li>• Water quality improvement</li> <li>• Slowing riverbank erosion; bank stabilization</li> <li>• Attenuating of flow energy</li> <li>• Sediment removal</li> <li>• Provision of LWD and organic matter</li> </ul>    |
| <p><b>3. Habitat Functions</b></p> <ul style="list-style-type: none"> <li>• Physical space and conditions for life history</li> <li>• Food production and delivery</li> </ul>                                     | <p><b>3. Hyporheic Functions</b></p> <ul style="list-style-type: none"> <li>• Removing excess nutrients and toxic compounds</li> <li>• Water storage and maintenance of base flows</li> <li>• Support of vegetation</li> <li>• Sediment storage</li> </ul> |
|   | <p><b>4. Habitat Functions</b></p> <ul style="list-style-type: none"> <li>• Physical space and conditions for life history</li> <li>• Food production and delivery</li> </ul>  |

Assessment of each function is based upon both quantitative data results derived from the GIS inventory information described in Chapter 3; a qualitative assessment based on aerial photography, field inventory (where possible); and existing assessment information prepared by such entities as the Pierce County’s Surface Water Management Division. As described in Chapter 3, the shoreline has been divided into broad assessment units based on waterbody, general land use, and ecological condition. In the ensuing tables, each assessment unit has been given an overall “rating” for ecological functions based on the available and relevant GIS information and the corresponding quantitative and qualitative evaluation. Rating was completed using a “low” to “high” function scale. The level categories are:

- Low (i.e. lowest quality functions)
- Low/Moderate
- Moderate
- Moderate/High
- High (i.e. highest quality functions)

### 4.3.1 Lake Tapps – Residential

The Lake Tapps – Residential assessment unit consists of those residential parcels located on Lake Tapps within the City’s jurisdiction. As indicated by the name of the unit, land use is entirely residential (primarily single-family), although there is one area of multi-family residential development within shoreline jurisdiction. The unit includes approximately 48,382 linear feet of shoreline – over 9 miles. Aerial oblique photographs (Exhibits 3 through 5) are from Ecology, taken in 2007. Water levels at the time the aerial

photos were taken are approximately three to four feet below the maximum summer elevation (USGS 2007).



Exhibit 3. Typical view of Lake Tapps shoreline – note high degree of armoring, high pier density (including covered moorage), and sparseness of shoreline vegetation.



Exhibit 4. View of west facing residential properties on Lake Tapps.



Exhibit 5. View of east facing residential properties on Lake Tapps.

Table 3. Function Summary of Lake Tapps – Residential

| <b>Lake Tapps – Residential</b>                                 |  |
|---|--|
| <b>Shoreline Processes and Functions within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
| <b>Hydrologic</b>   |  |
| Storing water and sediment                                      | LOW-MODERATE: The lake provides excellent water and sediment storage functions. However, the uplands surrounding the lake within shoreline jurisdiction have low water and sediment storage functions. Impervious surfaces (33% cover) and compact managed lawns interfere with infiltration of precipitation and rapidly send water “downstream.” Wetlands and other natural water and sediment storage features are generally lacking.   |
| Attenuating wave energy   | LOW-MODERATE: Bulkheading and other shoreline modifications have replaced native vegetation and natural woody debris as the features attenuating wave energy for approximately 90% of the shoreline length. Shoreline erosion is therefore not known to be a serious problem on the lake. Additionally, reduced lake levels during the winter months further reduce the potential for erosion.   |
| Removing excess nutrients and toxic compounds                   | LOW: The lake is surrounded by intensively landscaped lakefront homes – only 5% of lots remain vacant. The upland shoreline areas are more often a source of nutrients and toxic compounds, via lawn treatment runoff (pesticides, fertilizers, herbicides), pet wastes, road and construction site runoff (hydrocarbons, metals, sediment), and septic systems. The lake is on Ecology’s 303d list for invasive exotic species (Category 4). Water quality studies conducted in 2004 and 2005 indicated phosphorous is the primary nutrient limiting algal growth, while nitrate and ammonia concentrations were relatively low (Pierce County 2007). |
| Recruitment of LWD and other organic material                   | LOW: Dense residential development and other upland modifications restrict the ability of this lake unit to recruit LWD and organic material.  |
| <b>Vegetation</b>   |  |
| Temperature regulation  | LOW: Lack of dense shoreline vegetation nearly eliminates potential for some shading of the shallow-water nearshore area. Vegetation is less effective at shading west- and south-facing shoreline areas due to afternoon sun from the southwest.  |
| Water quality improvement                                       | LOW: Residential areas surround the lake and are dominated by lawn and landscaping rather than dense buffers of native lakeside vegetation. These residential landscapes are sources of water quality contaminants such as fertilizers, herbicides and pesticides. In addition to the typical residential landscaping pollutants, runoff from surrounding urban areas carries hydrocarbons, metals, sediments, and other pollutants to the lake from roads, parking lots, and other developed areas. There are approximately 15 stormwater outfalls to the lake through this shoreline unit.   |

| <b>Lake Tapps – Residential Shoreline Processes and Functions within Assessment Unit</b> |  | <b>Alterations and Assessment of Functions</b>  |
|--|--|---|
| Attenuating wave energy  |  | LOW: In its pre-buildout condition, the lake was ringed with mature mixed-forest communities. Those communities are now almost entirely absent around the lakeshore, so vegetation does not provide any significant wave attenuation function. As mentioned above, bulkheading up to 90% and other shoreline modifications have replaced native vegetation and natural woody debris as the features in place to reduce the effects of wave energy on uplands.   |
| Sediment removal and bank stabilization  |  | LOW: Under natural conditions, there would be an ongoing, underlying rate of shoreline erosion, which would contribute to maintaining substrate conditions. This rate would be partially determined and moderated by the presence of shoreline vegetation whose root systems would tend to hold bank material in place. Instead, the lake shore now has little shoreline vegetation and a large proportion of it is armored. While this “stabilizes” the banks, it limits natural recruitment of lakebed materials.   |
| LWD and organic matter recruitment   |  | LOW: Again, the loss of natural, forested shoreline vegetation and its replacement primarily with lawn and other types of landscaping has nearly eliminated LWD and organic matter recruitment potential along the lake shore. Any trees or LWD that enter the lake are likely to be quickly removed out of concern for safety or to reduce the risk of property damage.  |
| <b>Habitat</b>   |  |   |
| Physical space and conditions for life history   |  | LOW: Under natural conditions, the lake bottom would gradually rise in a shallow wedge such that incoming waves would roll up the bottom and onto the shore, losing energy. This reduced energy environment would be more hospitable to emergent vegetation, which further attenuates wave energy and provides a refuge for small fish and amphibians. Shallow nearshore areas in lakes typically provide rearing, foraging and migration habitat for fish. Shoreline armoring, however, generally reduces this low-energy shallow-water environment, creating a deeper, more turbulent nearshore area that is less hospitable to small fish and amphibians, as well as to emergent vegetation. Up to 90% of this shoreline unit is armored. The deeper water may also allow larger fish predators to prey on small fish. The absence of dense shoreline vegetation is a limiting factor in terrestrial species’ (birds, mammals, amphibians) use of the shoreline, since cover, food, nesting sites, travel corridors, etc. are limited or largely absent. |
| Food production and delivery   |  | LOW: Food production from the uplands is limited by the lack of native seed- and fruit-bearing vegetation. This may be made up for, in part, by fruit trees and other non-native vegetation in yards which supplies some food for wildlife. Not only does native upland vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water to provide food for fish and other aquatic life.   |

|   |   |
|---|---|
| <b>Lake Tapps – Residential</b>                                 |   |
| <b>Shoreline Processes and Functions within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>  |
| <b>Summary</b>  | Accounting for the existing hydrologic, vegetative, and habitat conditions within the shoreline surrounding Lake Tapps (residential properties), the overall shoreline ecological function is considered LOW. |

### **4.3.2 Lake Tapps – Park Facilities**

There are a total of three park properties located on the shoreline of Lake Tapps within City jurisdiction, two of which are private. The lone public park, Allan Yorke Park, is located in the southwestern corner of Lake Tapps and includes approximately 700 feet of shoreline. The entirety of the shoreline is hardened with bulkheads. The park is bisected by West Tapps Highway East. Amenities on the eastern (waterward) portion of the park include a boat launch, fishing dock, and swimming areas. Upland amenities include ball fields, playgrounds, a skateboard park, tennis courts, and restrooms. The southernmost portion of the shoreline is owned by the Cascade Water Alliance (CWA), while the northern portion is owned by the City.

Church Lake Park is located just to the northeast of Allan Yorke Park. The park is made up of two parcels and includes approximately 800 feet of shoreline frontage. The park is not open to the public as it is commonly owned by nearby property owners. Park amenities include a basketball court, picnic areas, a boat launch and a dock.

The third and final park on Lake Tapps within City jurisdiction is located on the western shoreline of Inlet Island. The park is made up of four separate parcels, and just like Church Lake Park, is not open to the public. The park includes a volleyball court, playground, several buildings, a boat launch, two docks and an enclosed swimming area. The park includes a total of approximately 280 feet of shoreline frontage.

Aerial oblique photographs (Exhibits 6 through 8) are from Ecology, taken in 2007. Water levels at the time the aerial photos were taken are approximately three to four feet below the maximum summer elevation (USGS 2007).



Exhibit 6. View of the shoreline at Allan Yorke Park.



Exhibit 7. View of Church Lake Park (private).



Exhibit 8. View of the unnamed park on Inlet Island (private).

Table 4. Function Summary of Lake Tapps – Park Facilities

| <b>Lake Tapps – Park Facilities</b>                             |  |
|---|--|
| <b>Shoreline Processes and Functions within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
| <b>Hydrologic</b>   |  |
| Storing water and sediment                                      | LOW-MODERATE: The lake provides excellent water and sediment storage functions. However, the uplands surrounding the lake within Shoreline jurisdiction have low water and sediment storage functions. Impervious surfaces (29%), compact managed lawns, and overall lack of native vegetation interfere with infiltration of precipitation and rapidly send water “downstream.” Wetlands and other natural water and sediment storage features are lacking.   |
| Attenuating wave energy   | MODERATE: Allan Yorke Park contains an armored shoreline with lawn or impervious surfaces and thus acts very similar to most of the residential areas along the lake. The other two private parks are both unarmored (based on aerial photos) and thus attenuate wave energy through natural gradient shorelines. In all cases, shoreline erosion is not known to be a serious problem on the lake. Additionally, reduced lake levels during the winter months further reduce the potential for erosion. Only 41% of the shoreline in this unit is armored.  |
| Removing excess nutrients and toxic compounds                   | LOW: Park properties contain large areas of lawn and other landscaping. The upland shoreline areas are more often a source of nutrients and toxic compounds, via lawn treatment runoff (pesticides, fertilizers, herbicides), pet wastes, road and construction site runoff (hydrocarbons, metals, sediment), and septic systems. The lake is on Ecology’s 303d list for invasive exotic species (Category 4). Water quality studies conducted in 2004 and 2005 indicated phosphorus is the primary nutrient limiting algal growth, while nitrate and ammonia concentrations were relatively low (Pierce County 2007). |
| Recruitment of LWD and other organic material                   | LOW: The loss of natural, forested shoreline vegetation and its replacement primarily with lawn and other types of landscaping has nearly eliminated the ability of the lakeshore to recruit LWD and organic material.   |
| <b>Vegetation</b>   |  |
| Temperature regulation  | LOW: Lack of dense shoreline vegetation nearly eliminates potential for some shading of the shallow-water nearshore area. Vegetation is less effective at shading west- and south-facing shoreline areas due to afternoon sun from the southwest.  |
| Water quality improvement                                       | LOW: Park properties are dominated by lawn and landscaping rather than dense buffers of native lakeside vegetation. These landscapes can be sources of water quality contaminants such as fertilizers, herbicides and pesticides. In addition to the typical landscaping pollutants, runoff from surrounding urban areas carries hydrocarbons, metals, sediments, and other pollutants to the lake from roads, parking lots, and other   |

| <b>Lake Tapps – Park Facilities</b>                             |  |
|---|--|
| <b>Shoreline Processes and Functions within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
| Attenuating wave energy   | <p>developed areas.</p> <p>LOW: Development of these park areas has removed most tree and shrub vegetation along the shoreline. Attenuation of wave energy is either performed by natural beach substrates (Church Lake Park or Inlet Island Park) or bulkhead (in the case of Allan Yorke Park), but not vegetation. Under natural conditions, shoreline vegetation would help attenuate wave energy through fallen woody debris or root structures along the shoreline edge. The absence of these conditions results in a LOW rating for the function even though wave energy might be attenuated by other circumstances.</p>  |
| Sediment removal and bank stabilization                         | <p>LOW-MODERATE: Under natural conditions, there would be an ongoing, underlying rate of shoreline erosion, which would contribute to maintaining substrate conditions. This rate would be partially determined and moderated by the presence of shoreline vegetation whose root systems would tend to hold bank material in place. Instead, the lake shore now has little shoreline vegetation and a portion of it (Allan Yorke Park) is armored. While this “stabilizes” the banks, it limits natural recruitment of lakebed materials. Both Church Lake Park and Inlet Island Park have unarmored shorelines, but neither have substantial shoreline vegetation which contribute to sediment movement and stabilization.</p>  |
| LWD and organic matter recruitment                              | <p>LOW: Again, the loss of natural, forested shoreline vegetation and its replacement primarily with lawn and other types of landscaping has nearly eliminated LWD and organic matter recruitment potential along the lake shore. Any trees or LWD that enter the lake are likely to be quickly removed out of concern for safety or to reduce the risk of property damage.</p>  |
| <b>Habitat</b>  |  |
| Physical space and conditions for life history                  | <p>LOW/MODERATE: Under natural conditions, the lake bottom would gradually rise in a shallow wedge such that incoming waves would roll up the bottom and onto the shore, losing energy. This reduced energy environment would be more hospitable to emergent vegetation, which further attenuates wave energy and provides a refuge for small fish and amphibians. Shallow nearshore areas in lakes typically provide rearing, foraging and migration habitat for fish. Shoreline armoring, however, generally reduces this low-energy shallow-water environment, creating a deeper, more turbulent nearshore area that is less hospitable to small fish and amphibians, as well as to emergent vegetation. The deeper water may also allow larger fish predators to prey on small fish. The absence of dense shoreline vegetation is a limiting factor in terrestrial species’ (birds, mammals, amphibians) use of the shoreline, since cover, food, nesting sites, travel corridors, etc. are limited or largely absent.</p> |
| Food production and delivery                                    | <p>LOW: Food production from the uplands is limited by the lack of native seed- and fruit-bearing vegetation.</p>  |

| <b>Lake Tapps – Park Facilities</b>                             |  |
|---|--|
| <b>Shoreline Processes and Functions within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
|   | <p>This may be made up for, in part, by fruit trees and other non-native vegetation which supplies some food for wildlife. Not only does native upland vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water to provide food for fish and other aquatic life.</p> |
| <b>Summary</b>  | <p>Accounting for the existing hydrologic, vegetative, and habitat conditions within the shoreline surrounding Lake Tapps (Park Facilities), the overall shoreline ecological function is considered LOW.</p>  |

### 4.3.3 Lake Tapps - Printz Basin Flume

The Printz Basin Flume assessment unit consists of that portion of the Printz Basin Flume located within City jurisdiction. The White River is diverted into the flume at the Buckley Diversion Dam, approximately 8 miles upstream of Lake Tapps. The westernmost 1,400 feet of the flume is located within City limits.

The flume itself, as is the lake, is owned by the Cascade Water Alliance. Adjacent undeveloped properties to the north and south, upon which shoreline jurisdiction extends, are owned by Puget Sound Energy.

The unit includes approximately 3,362 linear feet (27.7 acres) of shoreline edge. Aerial oblique photographs (Exhibits 9 through 11) are from Ecology, taken in 2007. Water levels at the time the aerial photos were taken are approximately three to four feet below the maximum summer elevation (USGS 2007).



Exhibit 9. View of the Printz Basin Flume looking east. Printz Basin is visible in the distance.



Exhibit 10. View of the Printz Basin Flume as it flows into Lake Tapps.



Exhibit 11. View of the south side of the Printz Basin Flume, including associated wetland, as it flows into Lake Tapps.

Table 5. Function Summary of Printz Basin Flume.

| <b>Printz Basin Flume</b>   |  |
|---|--|
| <b>Shoreline Processes and Functions Occurring within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
| <b>Hydrologic</b>   |  |
| Storage of water and sediment   | LOW - MODERATE: The diversion flume carries water through a man-made channel along much of its length in the City. During high flows, the flume is contained within a bermed bank, and so the channel itself is designed to convey floodwaters. Several parts to the diversion flume (Printz Basin and Wickersham Basin) were designed as open areas for sediment deposition – neither of which is located in the City. Therefore, this portion of the diversion flume is not intended to store water or sediment, but rather convey this to the lake.   |
| Transport of water and sediment   | MODERATE: The flume has been formed through this area with the intention of conveying water and sediment into Lake Tapps and acting less like a sink. Although sediment deposition occurs throughout the diversion flume, it occurs more readily at the mouth of the flume into Lake Tapps.  |
| Attenuating flow energy   | MODERATE: The flume is designed less to attenuate flow energy as it is to convey water. However, in this area of the flume within the City of Bonney Lake, the channel is lined with vegetation that may act to reduce flow energy during high flow events. Recruitment of woody debris, especially LWD, may occur along the banks and also reduce energy. The Printz Basin, upstream of the City limits, includes a large open water area and associated wetland which serve to dampen and moderate stream flow fluctuations. Still, the decrease in channel roughness brought on by a reduction in accumulated woody debris and bank vegetation has reduced the stream channel's ability to absorb and dissipate stream flow energy. |
| Developing pools, riffles, and gravel bars                                | LOW/MODERATE: Reduction in roughness elements, via channelization and removal of LWD has resulted in a simpler channel form which is less conducive to the formation and maintenance of the basic habitat elements, including pools, riffles, and gravel point bars.   |
| Removing excess nutrients and toxic compounds                             | MODERATE: Although the channelized flume is essentially cutoff from any large available floodplain, upland areas still provide a competent biofiltration function. However, the channel itself, due to its minimal length, reduced roughness, and linear flow, offers little ability to remove nutrients and toxic compounds.  |
| Recruitment and transport of LWD and other organic material               | MODERATE/HIGH: Streambank forest vegetation remains in-tact along much of the channel in the City, potentially allowing and contributing to recruitment and transport of LWD and organic material. However, a floating boom, located at the mouth of the lake, captures most of this floating debris and thus transport of this material to the lake is diminished.  |
| <b>Vegetation</b>   |  |

| <b>Alterations and Assessment of Functions</b> |  |
|--|--|
| <b>Printz Basin Flume</b>                      | <b>Shoreline Processes and Functions Occurring within Assessment Unit</b>  |
| Temperature regulation                         | <p><b>MODERATE/HIGH:</b> Well-vegetated banks and buffers improve shading conditions, in turn benefiting both temperature and dissolved oxygen. Although this section of the Printz Basin Flume is linear, the forested community along the banks provides shade along the majority of the channel length.</p>   |
| Water quality improvement                      | <p><b>MODERATE:</b> The linear channel offers less opportunity to improve water quality than a natural flowing sinuous channel. However, streambank vegetation along the flume, which consists of a mixed forest/shrub community, likely provides good water quality benefits to the aquatic environment.</p>  |
| Slowing riverbank erosion; bank stabilization  | <p><b>MODERATE/HIGH:</b> Although the flume channel is man-made with high berms, the forested vegetation community provides additional stability to the banks, thereby reducing erosion.</p>   |
| Attenuation of flow energy                     | <p><b>LOW/MODERATE:</b> (As stated above), the decrease in channel roughness due to a reduction in accumulated woody debris and channel straightening has reduced the channel's ability to absorb and dissipate stream flow energy. In-water or bank vegetation provides more stability rather than flow attenuation.</p>  |
| Sediment removal                               | <p><b>LOW/MODERATE:</b> As stated above, the linear channel and lack of a truly active floodplain greatly diminishes the ability of shoreline vegetation to function properly. This includes the lack of sediment removal. Under more natural stream and floodplain conditions, vegetation would act to reduce flow energy and thus allow for sediment to settle out.</p>  |
| Provision of LWD and organic matter            | <p><b>MODERATE/HIGH:</b> Shoreline vegetation along this flume section is dense, consisting of a mix of tree and shrub cover. Opportunities for LWD and organic matter to be introduced into the aquatic environment are high. However, the presence of a floating boom at the mouth to Lake Tapps reduces the likelihood that large material would reach the lake.</p>  |
| <b>Hyporheic</b>                               |  |
| Removing excess nutrients and toxic compounds  | <p><b>MODERATE:</b> The soils in this portion of the stream are generally poorly drained (Buckley loam – tends to be hydric) having been formed from Osceola mudflows. Given that the flume channel was man-made and not historically present to contribute to the development of a hyporheic zone, it is unlikely that the Printz Basin flume hyporheic zone performs any significant removal of excess nutrients or toxic compounds.</p> |
| Water storage and maintenance of base flows    | <p><b>MODERATE:</b> As above, the existing soils are not likely conducive to significant hyporheic flow, limiting the potential for water storage and base-flow maintenance.</p>   |

| <b>Alterations and Assessment of Functions</b>   |   |
|--|---|
| <b>Printz Basin Flume<br/>Shoreline Processes and<br/>Functions Occurring within<br/>Assessment Unit</b> |   |
| Support of vegetation  | MODERATE: Though hyporheic flow is likely limited given the above conditions, the riparian vegetation adjacent to the flume channel likely benefits from the close association with hyporheic water storage.  |
| <b>Habitat</b>   |   |
| Physical space and conditions for life history   | MODERATE: Habitat in and along the Printz Basin flume varies. Although the vegetative community in the upland shorelands provides extensive habitat for terrestrial species (accumulated downed wood and snags, resulting in places for various wildlife species to find cover or suitable nesting and rearing sites), the aquatic environment provides much less complexity. Within the channel itself, less wood overall similarly results in less available protective cover, and diminishes the creation of pool/riffle sequences as well. The lack of side channels, backwaters and sinuosity has limited the amount of valuable edge habitat available, and further reduced overall complexity. |
| Food production and delivery   | MODERATE/HIGH: Food production from upland areas is fairly good with native seed- and fruit-bearing vegetation. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drops into the water and provide food, either directly or indirectly, for fish and other aquatic life.  |
| <b>Summary</b>   | Accounting for the existing hydrologic, vegetative, hyporheic, and habitat conditions within the Printz Basin, the overall shoreline ecological function is considered MODERATE.  |

#### **4.3.4 Fennel Creek**

The Fennel Creek assessment unit consists of that portion of Fennel Creek that flows through City owned property just south of Rhodes Lake Road East (Exhibit 12). The parcel, approximately 9.7 acres in size, is completely surrounded by areas of unincorporated Pierce County, with the nearest areas of City jurisdiction located approximately 500 feet northwest of the parcel. Victor Falls, an 80-foot-high waterfall on Fennel Creek, is located just upstream of the City property. Fennel Creek is a perennial stream whose headwaters are located near the north side of SR-410 east of its intersection with 233rd Street East. The entire Fennel Creek Sub-basin drains approximately 11 square miles, of which three square miles are located within Bonney Lake. Victor Falls presents a fish passage barrier to anadromous fish attempting to migrate up Fennel Creek. Below the falls, and therefore on City property, Fennel Creek contains steelhead, coho, Chinook, and possible bull trout.

The City owned property, through which Fennel Creek passes is the location of the Victor Falls Springs, one of four wells from which the City draws its water. The City has assessed each of the four wells and determined that Victor Falls Springs is the least safe of the four due to its close proximity to nearby septic systems. However, nitrate levels at the well do not exceed the State Board of Health's maximum contaminant level.

The unit includes approximately 1,289.2 linear feet of shoreline.



Exhibit 12. View of the City owned property through which Fennel Creek flows (City GIS).

Table 6. Function Summary of Fennel Creek.

| <b>Fennel Creek</b>   |   |
|---|---|
| <b>Shoreline Processes and Functions Occurring within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>  |
| <b>Hydrologic</b>   |   |
| Storage of water and sediment   | MODERATE/HIGH: Fennel Creek, below Victor Falls and within the City's shoreline jurisdiction, flows through a fairly wide and steep riparian ravine consisting of a mixed forested vegetative community. A narrow adjoining floodplain and riparian wetland areas contribute to this creek's ability to store water and sediment during high flow events. Although narrow at times, the creek is able to spread out across its floodplain during high flows, and so the floodplain is still able to store and attenuate flood flows and trap and store fine sediments. These fine sediments are incorporated into the floodplain topsoil to nourish vegetative growth, in turn supporting wildlife habitat. |
| Transport of water and sediment   | MODERATE: The stream corridor has largely been undisturbed in this reach as it remains in protected City ownership for well water supply. However, increased development in the upper basin has likely altered the flow regime and the sediment transport capacity through this reach. This system may be less sensitive to such alterations, given that it is located just below Victor Falls.   |
| Attenuating flow energy   | MODERATE/HIGH: As mentioned above, this reach has largely remained undisturbed, with little floodplain encroachment. Riparian vegetation is well-established and generally abundant, providing energy attenuation during overbank flows.  |
| Developing pools, riffles, and gravel bars                                | MODERATE/HIGH: Riparian vegetation is generally good, and includes a mix of deciduous and coniferous cover, thus contributing to LWD in the channel and the development of pools and riffles.   |
| Removing excess nutrients and toxic compounds                             | MODERATE: Dense vegetation in the riparian wetland and floodplain areas provide a competent biofiltration function. These areas buffer the stream channel on this City-owned parcel and remove nutrients and toxics that may come from areas outside of shoreline jurisdiction. However, the soils (Xerochrepts 45 to 70 percent slope) are highly susceptible to slope failure, have high rates of runoff, and generally do not support a long-standing conifer community.   |
| Recruitment and transport of LWD and other organic material               | MODERATE/HIGH: Streambank forest vegetation remains in-tact along much of the creek both in and outside of the City's jurisdiction. This allows for potential recruitment and transport of LWD and organic material.  |
| <b>Vegetation</b>   |   |
| Temperature regulation  | MODERATE/HIGH: Well-vegetated banks and buffers improve shading conditions, in turn benefiting both temperature and dissolved oxygen. The combination of a well-established and maturing forest in the  |

| <b>Fennel Creek</b>   |  |
|---|--|
| <b>Shoreline Processes and Functions Occurring within Assessment Unit</b> | <b>Alterations and Assessment of Functions</b>   |
|   | shoreline/buffer areas, steep sloped ravine, and a relatively narrow active channel during low-flow periods results in excellent shade being provided to the stream.   |
| Water quality improvement   | <b>MODERATE/HIGH:</b> Riparian and flood plain areas are intact and well-forested, resulting in good biofiltration function. However, for fine sediments and pollutants originating from farther upstream, shoreline vegetation can only be effective at removing pollutants when stream flow is made to come in direct contact with the vegetation, which happens most effectively during flood events. Under low-flow conditions, there is less direct contact between the stream flow and the riparian vegetation, so considerably less biofiltration can occur. Water quality evaluations for Fennel Creek in 2006 by Pierce County rated the creek as Fair on the Benthic Index of Biotic Integrity (BIBI). |
| Slowing riverbank erosion; bank stabilization                             | <b>MODERATE/HIGH:</b> The well-forested stream banks provide good bank stabilization with streambank erosion occurring at rates consistent with well-functioning natural processes. However, the upper slopes of the ravine remain relatively unstable with high runoff rates and severe erosion hazards.  |
| Attenuation of flow energy  | <b>HIGH:</b> As mentioned above, this reach has largely remained undisturbed, with little floodplain encroachment. Riparian vegetation is well-established and generally abundant, providing energy attenuation during overbank flows. Complex flow patterns through areas of riparian wetlands and accumulated woody debris during flood events provide a rough channel, enhancing the stream's ability to absorb and dissipate flow energy.  |
| Sediment removal  | <b>MODERATE/HIGH:</b> Densely-vegetated forest vegetation, along with its associated leaf litter and forest duff, effectively filters and retains fine sediments. However, as mentioned above, the highly erodible soils of the forested ravine may contribute sediment inputs to the channel.   |
| Provision of LWD and organic matter                                       | <b>HIGH:</b> In contrast with most areas in the region, opportunity for the recruitment of large woody debris is good due to the forested condition and sloped ravine, and should improve further as the forest continues to mature. There are also good opportunities for the recruitment of small-to-medium woody debris and leaf litter that contribute to a decomposition-based food chain.  |
| <b>Hyporheic</b>  |  |
| Removing excess nutrients and toxic compounds                             | <b>MODERATE:</b> The soils in this portion the Fennel Creek shoreline are moderately well drained to somewhat excessively drained glacial till. Permeability varies but runoff tends to be very rapid. Given these conditions, the hyporheic zone is expected to be rather narrow, composed of the mapped floodplain area. The coarse substrate tends to be well drained, thus a higher likelihood that the hyporheic zone contributes to the removal of excess nutrients and toxic compounds.   |

| <b>Fennel Creek</b>   |   |
|---|---|
| <b>Shoreline Processes and Functions Occurring within Assessment Unit</b>   | <b>Alterations and Assessment of Functions</b>  |
| Water storage and maintenance of base flows   | <p><b>MODERATE:</b> Although the soils within this stretch of Fennel Creek likely contribute to water storage in the hyporheic zone, the area of available storage is minimized due to the steep ravine through which Fennel Creek flows.</p> <p><b>MODERATE:</b> The glacial till that tend to be present in the hyporheic zone can be so well-draining and poor at wicking water upward that plants growing above these gravelly soils can be deprived of water even when an active water table is near the surface. However, the presence of a dense forested community is evidence that vegetation can be readily supported throughout this reach.</p>  |
| Support of vegetation   | <p><b>MODERATE:</b> The glacial till that tend to be present in the hyporheic zone can be so well-draining and poor at wicking water upward that plants growing above these gravelly soils can be deprived of water even when an active water table is near the surface. However, the presence of a dense forested community is evidence that vegetation can be readily supported throughout this reach.</p>  |
| <b>Habitat</b>  |   |
| Physical space and conditions for life history  | <p><b>HIGH:</b> Though second-growth, the forest community provides habitat of good quality and complexity and in good quantity for fish and wildlife. The vegetation is complex and maturing, with accumulating downed wood and snags, resulting in more places for various wildlife species to find cover or suitable nesting and rearing sites. This increase in dense shoreline vegetation increases the quantity and quality of habitat available for use by terrestrial species (birds, mammals, amphibians) since cover, food, nesting sites, travel corridors, etc. are available and functioning.</p> <p>Within the stream channel itself, an increase in logs and overall wood similarly results in more available protective cover, the creation of pool/riffle sequences, and an increase in habitat complexity as described above. Shallow, low-energy aquatic areas provide critical rearing, foraging, and refuge habitat for amphibians and juvenile fish, particularly salmonids. Below Victor Falls, Chinook and coho salmon as well as steelhead, are present.</p> <p><b>MODERATE/HIGH:</b> The forest community along this portion of Fennel Creek should provide the food production that native wildlife are adapted to, including native seed- and fruit-bearing vegetation from wetland, floodplain, and upland areas. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drops into the water and provide food, either directly or indirectly, for fish and other aquatic life.</p> <p>Accounting for the existing hydrologic, vegetative, hyporheic, and habitat conditions within the Fennel Creek shoreline, the overall shoreline ecological function is considered <b>MODERATE/HIGH</b>.</p> |
| Food production and delivery  | <p><b>MODERATE/HIGH:</b> The forest community along this portion of Fennel Creek should provide the food production that native wildlife are adapted to, including native seed- and fruit-bearing vegetation from wetland, floodplain, and upland areas. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drops into the water and provide food, either directly or indirectly, for fish and other aquatic life.</p> <p>Accounting for the existing hydrologic, vegetative, hyporheic, and habitat conditions within the Fennel Creek shoreline, the overall shoreline ecological function is considered <b>MODERATE/HIGH</b>.</p>   |
| <b>Summary</b>  |   |
| <p>Accounting for the existing hydrologic, vegetative, hyporheic, and habitat conditions within the Fennel Creek shoreline, the overall shoreline ecological function is considered <b>MODERATE/HIGH</b>.</p> |   |

# 5 LAND USE ANALYSIS AND IMPLICATIONS

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## 5.1 Introduction

Land use patterns are an important consideration in SMP analysis because such analysis can identify opportunities for “preferred uses”, especially water-dependent, water-related and water-enjoyment uses. Land uses adjacent to the water are also a determinant in assigning environment designations to specific sections of the shoreline. Additionally, an analysis of land use conditions is necessary to determine potential land use changes and their effect on shorelines with respect to SMA objectives. Finally, the existing land uses and proposed environment designation boundaries and provisions must be mutually consistent with the City’s comprehensive plan.

As part of SMP development, the shoreline is to be classified into specific shoreline environment designations based upon existing land use patterns, baseline inventory results, goals stipulated in the City’s Comprehensive Plan, and Ecology criteria. Allowed uses, conditional uses, and prohibited uses will be defined for each designation. Ecology Guidelines include six recommendations for shoreline environment designations (listed below). However, each jurisdiction may use alternate or parallel environment designations, as appropriate, as long as they provide equal or better protection than the standard.

### Ecology Recommendations

- Natural
- Urban Conservancy
- Rural Conservancy
- Aquatic
- High Intensity
- Shoreline Residential

This section of the Analysis Report examines conditions of Bonney Lake shorelines with respect to potential environment designation criteria and potential use provisions to meet SMP objectives

## 5.2 Assessment Unit Conditions

This section examines the data gathered in the inventory and describes for each assessment unit the (1) likely future land uses and activities, and (2) implications for shoreline management (Table 7). Likely or appropriate environment designations are listed for each assessment unit.

Table 7. Likely changes in land use and implications for shoreline management.

| Reaches                     | Likely Changes in Land Use  | Implications for Shoreline Management   |
|-----------------------------|---|---|
| <b>Lake Tapps</b>           |   |   |
| <b>Residential</b>          | A majority of this reach is designated Single-Family Residential in the Comprehensive Plan and zoned R1 Single-Family, which allows single-family housing at a density of 4-5 net dwelling units per acre. There are a few areas that are designated Medium Density Residential in the Comprehensive Plan and are zoned R2 Medium Density Residential, which allows 5 - 9 dwelling units per acre. There is one area in the southwest portion of the lake that is designated High Density Residential and is zoned R3 High Density Residential, which allows 20 dwelling units per acre. A majority of these parcels are built out and are not likely to change use. Approximately 25 parcels within shoreline jurisdiction are vacant and have the potential to develop. Some redevelopment of existing housing stock may occur, but a majority of the housing stock has been built in the last few decades. | <b>Shoreline Residential</b> appears to be the most appropriate environment designation for the areas zoned R1 and R2 and <b>Shoreline Residential – Multifamily</b> appears to be the most appropriate environment designation for the areas zoned R3. While these areas are all in residential use, it is important to distinguish between single-family uses and multifamily uses because single-family is a preferred use in the SMA while multifamily development is not a preferred use, so the policies and regulations will be different. |
| <b>Parks and Open Space</b> | The parks and open spaces located within shoreline jurisdiction are designated Conservation/Open Space in the Comprehensive Plan and are generally zoned Public Facilities. (See Section 6.2 for a more detailed description of the parks.)   | <b>Urban Conservation – Open Space</b> appears to be the most appropriate environment designation for these areas.  |
| <b>Printz Basin</b>         | The area of Printz Basin within shoreline jurisdiction is designated Single-Family Residential and is zoned R-1 Single Family residential, but is undeveloped and vegetated.  | <b>Urban Conservancy or Natural</b> appears to be the most appropriate environment designation for this area.   |
| <b>Fennel Creek</b>         |   |   |
| <b>Fennel Creek</b>         | The area of Fennel Creek in shoreline jurisdiction is designated Public Facility and is zoned Public Facility. It is undeveloped and vegetated  | <b>Natural</b> appears to be the most appropriate environment designation for this area.  |

# 6 PUBLIC ACCESS ANALYSIS AND IMPLICATIONS

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## 6.1 Introduction

Public access includes the ability of the general public to reach, touch, and enjoy the water's edge, to travel on the waters of the state, and to view the water and the shoreline from adjacent locations.

WAC 173-26-221(4)(c) states that:

*"Local governments should plan for an integrated shoreline area public access system that identifies specific public needs and opportunities to provide public access... This planning should be integrated with other relevant comprehensive plan elements, especially transportation and recreation."*

To support this planning, WAC 173-26-201(3)(c) calls for local governments to inventory existing and potential shoreline public access sites, including public rights-of-way and utility corridors. Because shoreline access includes visual access, important views of the water from shoreline areas were also identified.

Information about public access sites in the City was drawn from site visits, aerial photographs, the City's Comprehensive Plan Parks Element, the City's Park and Recreation Department staff and websites, and the City's and County's land use and parks maps.

## 6.2 City Parks

### 6.2.1 Allan Yorke Park

Allan Yorke Park is 33.92 acres and is located at the South end of Lake Tapps, at the intersection of Bonney Lake Boulevard and West Tapps Hwy. The available recreational uses at the park include ball fields, a boat launch, fishing dock, playgrounds, skateboard park, in-lake swimming areas, and tennis courts. Amenities include concessions, restrooms and water fountains. Future work will likely include trail or sidewalk connections to off-site parking areas located to the southeast in order to improve access to the shoreline.

Additionally, the lot to the north of Allan Yorke Park is planned for multi-family development. As conditioned with the approved permit, this development would include dedicating the immediate shoreline east of West Tapps Hwy to the City.

## **6.2.2 Church Lake Park**

Church Lake Park is a 1.9 acre private park located on Lake Tapps used for recreational use. It includes a boat ramp, swimming enclosure in the lake, children’s play area, picnic space, and volleyball court. No change in use is anticipated for the future.

## **6.2.3 Inlet Island Park**

Inlet Island Park is a 1.5 acre private park located on Inlet Island on Lake Tapps used for recreational uses. The park includes a boat ramp, swimming enclosure in the lake with floating swim dock, picnic facilities, play area, and tennis, basketball, and volleyball courts. No change in use is anticipated for the future.

## **6.3 Trails**

### **6.3.1 Future Fennel Creek Trail**

The City developed the Fennel Creek Trail Plan in 2007 to create a trail that follows Fennel Creek and would eventually connect to the portion of Fennel Creek in shoreline jurisdiction.

According to the plan, the Fennel Creek Trail will connect Allan Yorke Park to the Foothills Trail and the future Pierce County Flume Trail. The City of Bonney Lake will develop the portion within the city limits (approximately 5.2 miles) from Allan Yorke Park to Victor Falls, toward Foothills Trail, and to 214<sup>th</sup> Ave. E. – toward the Flume Trail. The trail will parallel the creek within the creek buffer to allow trail users to experience the sights and sounds of the woodlands and pastoral scenes along the creek corridor. Some of this corridor is currently in City or other public ownership. Much of it, however, is under private ownership. As such, the trail route must be developed over time as private property is purchased - or is acquired through the City’s subdivision approval process. Until trail property is acquired, the initial sections of the trail will be connected using existing public right-of-way as “short-term links”. To that end, sidewalks will need to be built along some of the streets.

## **6.4 Public Access Implications**

The City only provides one public access and recreation site along Lake Tapps and should therefore continue to pursue opportunities to add new public access and recreation sites along the lake. The City should pursue opportunities for purchasing vacant parcels along the lake and the possibility of developing small public access sites. While the private parks provide access for residents along the lake, these private sites cannot replace the need for public access sites. Other than the potential expansion of Allan Yorke Park as described above, the City has not identified new opportunities for public access sites along Lake Tapps.

The City's Comprehensive Plan does identify the need for additional neighborhood parks, but according to the Level of Service standards used for the Comp Plan, the currently underserved areas are not within shoreline jurisdiction. The City should consider reevaluating this needs assessment with shoreline public access in mind.

Fennel Creek does not currently have public access in the area within shoreline jurisdiction, so the City should continue to work to implement the Fennel Creek Trail Plan.

## 7 SHORELINE MANAGEMENT RECOMMENDATIONS

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The following are recommended actions for translating inventory and characterization findings into the draft SMP policies, regulations, environment designations, and restoration strategies for areas within shoreline jurisdiction. While CWA operations of Lake Tapps as a water supply reservoir rather than former hydroelectric power generation may have some effect on the annual hydrograph, water levels are not expected to affect future land use changes. Regulations under the City's SMP are also not likely to impact or regulate water withdrawal strategies by CWA.

### 7.1 Shoreline Master Program

#### 7.1.1 Shoreline Environment Designation Provisions

- Recommendations for specific shoreline segments are discussed in section 5.0.

#### 7.1.2 General Policies and Regulations

##### Shorelines of Statewide Significance

- Considering that Lake Tapps is a Shoreline of Statewide Significance, the SMP will need to address specific management policies as listed in WAC 173-26-251 which gives preference to uses in the following order of preference which:
  - (1) Recognize and protect the statewide interest over local interest;
  - (2) Preserve the natural character of the shoreline;
  - (3) Result in long term over short term benefit;
  - (4) Protect the resources and ecology of the shoreline;
  - (5) Increase public access to publicly owned areas of the shorelines;
  - (6) Increase recreational opportunities for the public in the shoreline;

- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary."

### **Critical Areas**

- Consider whether the City's critical areas regulations should be incorporated into the SMP by reference or through direct inclusion (WAC 173-26-191).
- Maintain a 200-foot buffer on Fennel Creek to the extent consistent with existing conditions and the objectives of the Shoreline Management Act.

### **Flood Hazard Reduction**

- Consider how to incorporate the various options developed by FEMA and others during development of the strategy for responding to National Marine Fisheries Service Biological Opinion evaluating FEMA's National Flood Insurance Program.

### **Public Access**

- Work with the Community Services Department to identify potential locations for new public access sites and to identify improvements to increase the quality of existing public access to shorelines throughout the City.

### **Vegetation Conservation**

- Establish appropriate residential setbacks on Lake Tapps, recognizing the existing conditions and potential for providing improved shoreline vegetation as part of setback modification options.
- Encourage through policy and regulation the control of invasive or noxious vegetation, including aquatic vegetation found in Lake Tapps. Coordinate with Pierce County Surface Water Management and Washington Department of Fish and Wildlife regarding preferred and effective aquatic vegetation removal mechanisms.

### **Water Quality, Stormwater, and Nonpoint Pollution**

- Include policies and regulations that appropriately incorporate recommendations of the City's and County's water quality-related studies, particularly as related to impaired parameters listed by Ecology or outcomes of the NPDES Municipal Stormwater Permit requirements.
- Ensure that regulations allow for placement of any water quality-related structures or facilities in shoreline jurisdiction, including in the Aquatic environment.

- Consider whether special stormwater management provisions may be necessary beyond the standard City requirements contained in the adopted Ecology Stormwater Management Manual for Western Washington.

### **7.1.3 Shoreline Modification Provisions**

#### **Shoreline Stabilization**

- Ensure “replacement” and “repair” definitions and standards are consistent with WAC 173-26-231(3)(a). Repair activities should be defined to include a replacement threshold so that applicants and staff will know when “replacement” requirements need to be met.

#### **Piers and Docks**

- Provide clear dimensional standards for new piers and replacement/modified piers for private residential use. Coordinate with Washington Department of Fish and Wildlife to ensure that standards are consistent with current agency practice on the lake.

#### **Fill**

- Restoration fills should be encouraged, including improvements to shoreline habitats, material to anchor LWD placements, and as needed to implement shoreline restoration.

#### **Breakwaters, Jetties, Groins and Weirs**

- Except for purposes of shoreline restoration (or possibly as part of flood hazard reduction), consider prohibiting these modifications.

#### **Shoreline Habitat and Natural Systems Enhancement Projects**

- The SMP should include incentives to encourage restoration projects, particularly in areas identified as having lower function. Emphasize that certain fills can be an important component of some restoration projects.

### **7.1.4 Shoreline Uses**

#### **Agriculture**

- Consider prohibiting this use and removing it from this section.

#### **Aquaculture**

- Consider prohibiting this use and removing it from this section.

#### **Boating Facilities**

- Develop appropriate standards for community and public-access related overwater structures.

## **Commercial Development**

- Consider prohibiting this use and removing it from this section.

## **Forest Practices**

- Provide general policies and regulations for forest practices according to the WAC Guidelines.

## **Industry**

- Consider prohibiting this use and removing it from this section.

## **Mining**

- Consider prohibiting this use and removing it from this section.

## **Recreational Development**

- Work with the Community Services Department and other entities that may own park land to identify issues related to park development. Park lands provide many opportunities for shoreline restoration and can serve as demonstration projects to the greater public. Policies and regulations related to parks management should provide clear preferences for shoreline restoration consistent with public access needs and uses. Existing natural parks should be protected and enhanced.
- In addition, ensure that water-dependent and water-oriented uses are given priority in parks over other uses.

## **Residential Development**

- Address building setbacks, shoreline armoring, piers and docks, and vegetation conservation for residential properties. Developed lakes, such as Lake Tapps, have been impacted by nearshore vegetation removal, shoreline armoring, and piers. The SMP should consider developing regulations that encourage or require shoreline restoration when specific new development or redevelopment activities are proposed. A standard buffer and/or setback should be developed, with an aggressive but practical list of buffer/setback reduction options that would result in a net improvement in shoreline functions. These might include removal of bulkheads, shoreline plantings, landscape chemical reduction or elimination, and removal of other nearshore impervious surfaces, among others.
- Include a policy to educate waterfront homeowners about the use of fertilizers and chemicals and encourage natural lawn care and landscaping methods to reduce chemical output into surrounding shorelines.

- Encourage low impact development techniques that reduce impervious surface areas and use of ecologically responsible stormwater management.

### **Transportation/Parking and Utilities**

- Include provisions for public transportation and utilities development in the shoreline jurisdiction. There are some roadways in SMA jurisdiction. Goals, policies and regulations for these activity types should require careful consideration of short-term and long-term impacts on shoreline functions and processes, particularly in their management of stormwater runoff, shoreline hardening and potential for generating a later need for shoreline hardening, and placement of in-water structures which can affect flows and substrates, among others.

## **7.2 Restoration Plan**

A Restoration Plan document will be prepared as a later phase of the Shoreline Master Program update process, consistent with WAC 173-26-201(2)(f). The Shoreline Restoration Plan must address the following six subjects (WAC 173-26-201(2)(f)(i-vi)) and incorporated findings from this analysis report:

- (i) *Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;*
- (ii) *Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;*
- (iii) *Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;*
- (iv) *Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;*
- (v) *Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and*
- (vi) *Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.*

The Restoration Plan will “include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions

should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program.” The Restoration Plan will mesh potential projects identified in this report with additional projects, regional or City-wide efforts, and programs of the City, watershed groups, and environmental organizations that contribute or could potentially contribute to improved ecological functions of the shoreline.

## 8 REFERENCES

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- Bruce Dees & Associates. 2007. Fennel Creek Trail Plan. Prepared for the City of Bonney Lake. June 2007.
- City of Bonney Lake GIS, 2009.
- City of Bonney Lake. 2008. City of Bonney Lake Comprehensive Plan.
- ESA Adolfson. 2009. Pierce County Shoreline Master Program Project, Final Shoreline Inventory and Characterization Report. June. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.
- ESA Adolfson. 2008. Pierce County Shoreline Master Program Update Project: Shoreline Restoration Plan. Prepared for Pierce County Planning and Land Services Department. Pierce County, WA.
- Federal Emergency Management Agency (FEMA). 1980. Flood Insurance Rate Map (FIRM). City of Bonney Lake, Pierce County, panels 1 and 2 of 2.
- Kerwin, J. 1999. Salmon Habitat Limiting Factors Report for the Puyallup River Basin - WRIA 10. Washington Conservation Commission, Olympia, WA. July 1999.
- Pierce County Public Works & Utilities, Water Programs Division. 2007. White River Basin Plan Characterization Report. September 2007.  
<http://www.co.pierce.wa.us/pc/services/home/envIRON/water/ps/watershed/whiterivermain.htm>
- The Transpo Group, Inc. 2006. City of Bonney Lake 2006 Transportation Plan. April 2006.
- United States Geological Survey. 2007. Water-Data Report 2007 - 12101000 Lake Tapps Near Sumner, WA.
- Washington Department of Archaeology & Historic Preservation.  
<http://www.dahp.wa.gov/pages/wisaardIntro.htm>
- Washington Department of Ecology. 2008. Washington Water Quality Assessment 303(d).
- Washington Department of Ecology. 2006. Lake Tapps (Pierce County) Monitoring, Final Data Report. January 2006. <http://www.ecy.wa.gov/biblio/0603006.html>

Washington Department of Ecology. 1998. Chapter 173-510, Instream Resources Protection Program – Puyallup River Basin, Water Resource Inventory Area (WRIA) 10. June. <http://www.ecy.wa.gov/biblio/wac173510.html>.

Washington Department of Fish and Wildlife. 2010. Priority Habitats and Species database search results prepared for The Watershed Company, 4 January 2010.

\_\_\_\_\_. 2002. Salmonid Stock Inventory. <http://wdfw.wa.gov/fish/sasi/Washington> Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory. March 1993. Olympia, WA. 212 p.

Washington Department of Natural Resources. GIS overwater cover data.

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A Catalog of Washington Streams and Salmon Utilization, Vol. 1, Puget Sound Region. Washington Department of Fisheries.

## 9 LIST OF ACRONYMS AND ABBREVIATIONS

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|---------------|--|
| CAO .....     | Critical Areas Ordinance                   |
| Corps.....    | U.S. Army Corps of Engineers               |
| CWA.....      | Cascade Water Alliance                     |
| Ecology ..... | Washington Department of Ecology           |
| GMA.....      | Growth Management Act                      |
| HPA.....      | Hydraulic Project Approval                 |
| LWD.....      | Large Woody Debris                         |
| NRCS.....     | Natural Resources Conservation Service     |
| PHS.....      | Priority Habitats and Species              |
| SMA.....      | Shoreline Management Act                   |
| SMP .....     | Shoreline Master Program                   |
| USFWS.....    | U.S. Fish and Wildlife Service             |
| USGS .....    | U.S. Geological Service                    |
| WDFW .....    | Washington Department of Fish and Wildlife |

